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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/516,527

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Christian Laurent-Lund

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EXAMINER

PAK, SUNG H

ART UNIT

PAPER NUMBER

2874

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/516,527	Applicant(s) LAURENT-LUND, CHRISTIAN	
	Examiner Sung H. Pak	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 31-62 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-20 and 31-62 is/are rejected.
- 7) ☒ Claim(s) 13 and 59 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/25/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's claim amendment filed 1/22/2007 is entered. Applicant's election of Group IV, as indicated in applicant's response filed 1/22/2007, is hereby acknowledged. The claim amendment changes the scope of the claimed invention such that claims 11-62 share at least one special technical feature of Group IV. Therefore, claims 11-62 are examined, and claims 1-10 are withdrawn from further consideration.

Claim Objections

Claims 13, 59 are objected to because of the following informalities: claims recite, "said first waveguide". However, "said first waveguide" lacks proper antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-12, 19, 57 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawachi et al (US 4,978,188).

Kawach reference discloses an optical device with all the limitations set forth in the above-mentioned claims, including: a core region pattern (e.g. '4' or '5' in Fig. 5B) surrounded by lower cladding (e.g. portion of cladding layer '12' in Fig. 5B that is located below the core '4' or '5') and upper cladding layers (e.g. portion of cladding layer '12' in Fig. 5B that is located above the core '4' or '5'), the core region pattern being formed in a layer applied to the lower cladding layer supported by the substrate (e.g. '1' in Fig. 5B) and the upper cladding layer being applied to cover the core region pattern and the lower cladding layer (Fig. 5B), the combination of waveguides including spaced, parallel, diverging OR merging waveguide core sections (e.g. better shown in Fig. 5A); and a stress reducing/ relieving element (e.g. '23a' or '23b' in Fig. 5B) located in the vicinity of said spaced, parallel, diverging or merging waveguide core sections (the isolation trenches '23a' and '23b' inherently and necessarily isolates the core sections from stress or strain experienced by the adjacent cladding layer '12');

wherein said component is a branching element (e.g. waveguide cores 'branch' above the coupling portion '2' as shown in Fig. 5A).

Claims 11-20, 45-56, 58-62 are rejected under 35 U.S.C. 102(b) as being anticipated by Li (US 5,745,618).

Li reference discloses an optical device with all the limitations set forth in the above-mentioned claims, including: a core region pattern (e.g. '26' in Fig. 3) surrounded by lower ('27' Fig. 3) and upper cladding layers ('28' Fig. 3); the core region pattern being formed in a layer applied to the lower cladding layer supported by the substrate ('200' Fig. 3) and the upper cladding layer being applied to cover the core region pattern and the lower cladding layer (Fig.

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3); the combination of waveguides including spaced, parallel, diverging or merging waveguide core sections ('26' Fig. 5); and a void reducing or stress reducing structural elements ('22' Fig. 5- although the reference does not explicitly state the "stress relieving" function of the structural elements '22', it fully anticipates all claimed structural features recited in the present application, and therefore necessarily and inherently anticipates the "stress relieving element" as recited) located in the vicinity of said spaced, parallel, diverging or merging waveguide core sections (Fig. 5);

wherein the minimum distance between a first waveguide and said stress relieving element is smaller than three times the height of the first waveguide (height of the waveguide is disclosed as 7 microns- column 4 lines 22-23; distance between the waveguide and the stress relieving element is zero since they intersect as shown in Fig. 5);

wherein said stress relieving element is elongate and has a width that is less than or equal to the width of a nearest waveguide ('a_n' in Fig. 5 has width that is less than that of the nearest waveguide);

wherein said structural element includes a plurality of parallel running stress relieving elements (Fig. 5);

wherein the distance between neighboring stress relieving elements is less than 15 microns, or less than 10 microns or less than 5 microns ('Λ' in Fig. 6; column 5, lines 26-28 in conjunction with Fig. 6 discloses that Λ may be less than 15 microns, less than 10 microns, or less than 5 microns);

wherein said stress relieving element has width dimension larger than the nearest waveguide ('a₁' is wider than '26' in Fig. 5);

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wherein said stress relieving element has a form that substantially matches the space between two merging or diverging waveguide core sections (Fig. 5);

wherein said stress relieving element is a transversal elements formed in the waveguide core layer and connecting space, parallel, diverging or merging waveguide core sections (Fig. 5).

Regarding method claim 45 (and its dependent claims), Li reference discloses a method of manufacturing the optical waveguide device discussed above, including the steps of providing a substrate, lower cladding layer, core layer and upper cladding layer; providing a core mask for forming the core and stress relieving elements using photolithographic and etching process (column 3, lines 50- column 4 lines 32);

wherein the step of providing a substrate includes providing a silicon substrate (column 3, line 61), and core and cladding layers that are silica glass (column 3, line 59-61);

wherein the cladding layers are doped with boron or phosphorous (column 4, lines 1-2);

wherein at least some of the layers are formed by plasma enhanced chemical vapor deposition and annealing (column 4, lines 1-2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 31-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US 5,745,618) in view of EP '263 (EP 1045263 A1).

Li reference discloses an optical waveguide device as discussed above. However, it does not explicitly teach the use of a segmented waveguide pieces such that two waveguide sections form substantially parallelogram shapes and symmetric around an axis midway between the center axes of the two waveguide sections, in the manner claimed in the instant application.

However, such segmented optical waveguides are well known and common in the art, for example as taught by EP '263 (Fig. 2). Segmented waveguides are well known to be advantageous and desirable because they allow for low optical coupling loss and allow for high precision waveguide manufacturing. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Li to have segmented waveguide pieces as taught by EP '263.

Conclusion

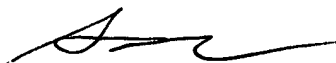
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. McGreer et al (US 6,697,552 B2), Wang et al (US 7,006,729 B2), Nakamura (US 5,818,989) are pertinently related to the presently claimed optical waveguide device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571)272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Sung H. Pak
Primary Patent Examiner
Art Unit 2874